IMAGINE Advantage®
PRODUCT DESCRIPTION

erdas
The Earth to Business Company

IMAGINE Advantage

Product Description

More than 30 years of geospatial research and software development has culminated in the ERDAS IMAGINE® suite of software. IMAGINE Advantage® is the mid-level tier of ERDAS IMAGINE. Other than IMAGINE Professional®, there is no more powerful and carefully designed product for creating, visualizing, geocorrecting, reprojecting and compressing geospatial data in single or batch modes than IMAGINE Advantage.

IMAGINE Advantage builds upon the geospatial capabilities of IMAGINE Essentials® to offer more advanced and precise mapping and image processing capabilities. IMAGINE Advantage gives GIS professionals, image analysts and photogrammetrists more analysis capabilities to make better, more informed decisions. IMAGINE Advantage can provide strategic value to a variety of industries including data providers, agriculture, forestry, natural resource management, telecommunications, environmental engineering and the extractive industries.

Please also review the IMAGINE Essentials product description for the capabilities and features available for all levels of the ERDAS IMAGINE suite.

Key Features

Parallel Batch Processing - IMAGINE Advantage extends the serial process capabilities available within IMAGINE Essentials to introduce a parallel processing capability. Up to four processes, such as reprojection, compression, or image enhancement functions can be run simultaneously for each IMAGINE Advantage license. Multiple floating licenses of IMAGINE Advantage may be accessed to go far beyond four parallel processes.

Orthocorrection - IMAGINE Advantage expands the standard techniques available in IMAGINE Essentials to include sensor-based modeling and single-frame orthocorrection.

- Sensor models for orthocorrecting data
  - Standard frame cameras
  - Digital camera
  - ALOS PRISM
  - ALOS PRISM with RPC
  - ASTER Rigorous Orbital model
  - CARTOSAT RPC
  - DPPDB
  - EROS 1A & 1B
  - FORMOSAT2
  - Frame Camera
  - GEOEYE-1/OrbView-3
  - IKONOS NITF
  - IKONOS with RPCs
  - IRS-1C / 1D
  - Landsat TM, MSS, ETM+
  - MODIS
  - OrbView3 Rigorous Orbital model
  - OrbView3 RPC
  - QuickBird with RPC
  - QuickBird/WorldView (including NCDRD format)
  - RADARSAT
  - RESOURCESAT
  - SPOT 5 Rigorous Orbital model
  - SPOT Pan, XS, XI
  - WorldView RPC

- Orthocorrection models for solving when ephemeris information is lacking
    - Direct Linear Transform (DLT)
    - Projective Transform
- Specify principal point and focal length for the camera
- Select fiducial layout type and record film location template
- Measure fiducial image locations
- Specify/calculate rotation angles for Omega, Phi, Kappa
- Specify/calculate perspective center position for X, Y, Z
- Account for the Earth's curvature
- User-specified number of iterations
- Specify output projection system
- Select GCP reference coordinates from map, image, vector or keyboard
- Standard GCP editor extended to allow the definition of Z values

Raster Product Format (RPF) production

- Controlled Image Base (CIB)
- Compressed Arc Digital Raster Graphics (CADRG)

Increase in ECW / JPEG2000 Capability above IMAGINE Essentials

- Create an unlimited number of ECW and JPEG2000 compressed images from input images up to 500 Gpixel with export, direct-write, and MosaicPro.

Metric Accuracy Assessment (MAA) tool - When delivering products derived from imagery, users should always be able to state the spatial accuracy of those products. The MAA tool enables calculation of the accuracy of mono or stereo pair imagery (stereo analysis restricted to RPC models) using photo-identifiable ground control points.

- Control (or Test & Evaluation – T&E) points can be manually entered or read from file
- Calculation of error statistics
- Individual point error and statistics report
- Error computations are based on MIL-STD-600001, with bias taken into account
- CE is computed using horizontal error as input to the LE formula with bias

Mosaicking - IMAGINE Advantage provides MosaicPro, the geospatial industry's most robust mosaicking capability. MosaicPro provides cutline creation and editing, color-balancing, illumination correction, feathering, dodging and more for the creation of seamless mosaics and image tiles. From a pair of images to over 16,000 images, MosaicPro handles it all.

- MosaicPro user interface to manage all aspects of the mosaic process including graphics and image display options
- Mosaic Express for easy learning and rapid setup times
- Command line interface for production batch processing
- Mosaic multiple images with:
    - Differing or like resolution (pixel sizes)
    - Differing or like projection systems
    - Geometric calibration or finished orthorectification
- Select the images to mosaic individually, by all the files in the directory, or by all the files in a file list
- Use relatively positioned images or images with just map information in addition to fully georeferenced images.
- Load images directly from a LPS block file
    - Select elevation sources in any supported raster format
- Control the image area considered for mosaicking
    - Use the entire image
    - Compute an active area
    - Use a template AOI
    - Use an individual AOI
    - Crop edges by percentages (provides for automatic clipping of fiducials from scanned frame imagery)
- Automatic image loading and unloading based on user setting for large product efficiency

- Multiple options for ordering and sorting imagery
    - Promote and demote individual images or selected groups
    - Order by source date, and write source date and image name metadata to output seamline shapefile
    - Sort images to minimize overlap areas
- For overlap areas, cutlines can be defined automatically or by the user
    - Save to/load from shapefile
    - Automatic geometry based cutlines
    - Automatic weighted cutlines
- Additional cutline options for triangulated data
    - Most Nadir
    - Most Nadir Narrow
    - Most Nadir by DTM
- Cutline editing in interface with WYSIWG (what you see is what you get) approach to provide real-time feedback of included imagery changes
- View reference seam polygons for working on geographically adjacent products
- Color balancing
    - Manual or semi-automated
    - Define abnormal areas for exclusion from processing
    - Surface-fitting removes spatially varying illumination effects such as hot spots
    - Option to use existing lookup tables
    - Preview color balancing effects
- Dodging
    - User definable grid size
    - Band dependant or independent
    - Dodge across images or individually
    - Manually editable correction settings
    - Preview
- Histogram matching based on
    - Image to image
    - Overlap areas only
    - Ideal target histogram
- Illumination equalization to adjust illumination variations (from sun glint, etc.)
- Full control over the algorithm applied at each image overlap region
- Radiometric seam smoothing and feathering
- Preview finished mosaic results in a local user-defined area including seam feathering, smoothing, radiometric adjustments, and output GSD changes. This allows for parametric optimization before running a full mosaic job.
- Output a single file or cut into project files
    - Union of all inputs to single file
    - User-defined AOI to single file
    - Multiple AOIs to separate files
    - Use Map Series file to output to multiple files on user defined grid pattern
    - ASCII sheet file definition
    - Rotated output sheets
    - Global clip boundary
- Specify output projection cell size and data type

Image Processing & Spatial Analysis - IMAGINE Advantage provides access to over 100 standard image processing and GIS techniques for enhancing and analyzing data.

- Spatial enhancement
    - Resample / reproject
    - Degrade
    - Convolution filters
    - Non-directional edge detection
    - Texture analysis
    - Wallis adaptive filter

- Crisp
- Statistical filter
- Homomorphic filter
- Morphological operators
  - Open
  - Close
  - Erode
  - Dilate
- Focal (neighborhood) analysis
- Wallis adaptive filter
- Pan sharpen
  - Hyperspherical Color Space pan sharpening
    - Developed specifically for WorldView-2
  - Subtractive resolution merge
  - High Pass Filter (HPF) resolution merge
    - Trade color for sharpness, or vice versa
    - 2Two-pass process for high spatial-disparity images
  - Modified IHS resolution merge
    - Tailored to be sensor-specific
    - Maintains spectral radiometry
    - Merge multiple bands, not just three
  - Wavelet resolution merge
  - Ehlers Fusion
    - Wavelet based pan sharpening
    - Automatic or manual filtering schemes
  - Resolution merge
    - Principal Component
    - Multiplicative
    - Brovey Transform
- Radiometric enhancement
  - Look-Up table stretch
  - Rescale data
  - Noise reduction
  - Periodic noise removal
  - Landsat 7 reflectance and radiance conversion
  - Destripe Landsat
  - Replace bad lines
  - Histogram match
  - Brightness inversion
  - Histogram equalization
  - Topographic normalize
- Spectral enhancement
  - Layer stack
  - Principal component
  - Inverse principal component
  - Independent component
  - Tasseled cap transformation
  - Decorrelation stretch
  - RGB to IHS
  - IHS to RGB
  - Spectral mixer
- Hyperspectral tools
  - Normalize spectrum
  - Internal Average Relative Reflectance (IARR)
  - Log residuals
  - Rescale
  - Spectrum

- Signal-to-noise ratio
- Mean per pixel
- Profile tools

- Thematic (GIS, many applicable for vector as well as raster)
  - Thematic to RGB
  - Random class colors
  - Recode
  - Neighborhood functions
  - Morphological
  - Search (buffer)
  - Clump, sieve and eliminate classes
  - Perimeter of clumps
  - Aggregation of thematic classes
  - Zonal attributes (parcel statistics)
  - Matrix union
  - Summary report of matrix union)
  - Overlay (minimum or maximum)
  - Index (weighted summation)
- Fourier analysis
  - Fourier transform
  - Graphical fourier transform editor
  - Inverse fourier transform
  - Fourier magnitude
- Classification
  - Vegetation indices (VI, NDVI, TNDVI, etc.)
  - Other indices (iron oxide, clay minerals, ferrous minerals, mineral composite, etc.)
  - RGB clustering
- Terrain analysis
  - Terrain preparation (see above)
  - Anaglyph
  - Recalculate elevation values
  - Elevation library
  - Route intervisibility
  - Slope angle
  - Aspect facing
  - Painted relief
  - Shaded relief
  - Level slice
  - Raster contour
  - Image drape
- Functions
  - Two image mathematical union functions
  - Two image mathematical intersection functions
  - Single image mathematical functions
- Change detection
  - Zonal change detection
  - Image differencing
  - Discriminant Function Change
  - Subset
  - Vector to raster
  - Thematic to RGB
  - Image dicer/tiler
- Generic options
  - Restrict function to Area of Interest (AOI) or rectangular subset
  - Stretch to 8-bit data range
  - Ignore zero values in output statistics
  - Schedule for batch processing

- Vector to raster

Modeling Language - The Spatial Modeling Language (SML) is highly flexible, enabling users to create and run customized models for image processing and GIS analysis. The Spatial Modeler fully supports the input of calibrated imagery and will output it to a specified projection system. The majority of Image Interpreter functions, which use the underlying Spatial Modeler programs, now also support multiple input projection systems and calibrated imagery.

- Model librarian with built-in editor
- Over 80 example SML scripts to customize
- Specify the projection system when inputting two or more images of differing projections into a model
- Function types (over 200 provided)
  - Point
  - Neighborhood (focal)
  - Global
  - Zonal
  - Layer
- Statements
  - Declarations
  - Assignments
  - Show, read and write
  - Set
  - Macro definitions
  - Quit
  - Flow control
  - Statement blocks
- Object types
  - Scalar
  - Table
  - Matrix
  - Raster
  - Vector
- Data types
  - Binary
  - Integer
  - Float
  - Complex
  - Color
  - String
- Variables
- Windows
- Syntax error checking
- Calibration and reprojection support

Knowledge Classifier - Using knowledge bases created with IMAGINE Professional®, IMAGINE Advantage users can classify geographic data with the simple, user-friendly Knowledge Classifier wizard interface.

- Evaluate classification classes
- Automatically identify missing files
- Output fuzzy sets, confidence layers and feedback layers, as well as classifications

Knowledge bases created by expert users in IMAGINE Professional can be distributed to IMAGINE Advantage users anywhere in the world to apply classification processes to their data. This portability is one of the keys to the strength of the expert systems approach. See the IMAGINE Expert Classifier™ section in the IMAGINE Professional Product Description for more details about the IMAGINE Expert Classifier.

About ERDAS

ERDAS – The Earth to Business Company – helps organizations harness the information of the changing earth for greater advantage.

ERDAS creates geospatial business systems that transform our earth's data into business information, enabling individuals, businesses and public agencies to quickly access, manage, process and share that information from anywhere.

Using secure geospatial information, ERDAS solutions improve employee, customer and partner visibility to information, enabling them to respond faster and collaborate better. It also means better decision-making, increased productivity and new revenue streams.

ERDAS is a part of the Hexagon Group, Sweden. For more information about ERDAS or its products and services, please call +1 770 776 3400, toll free +1 866 534 2286, or visit www.erdas.com.